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**METHOD OF IMMOBILIZING BIOLOGICALLY ACTIVE MOLECULES  
FOR ASSAY PURPOSES IN A MICROFLUIDIC FORMAT**

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**ABSTRACT OF THE DISCLOSURE**

The invention provides biological molecules entrapped within a sol-gel matrix and incorporated into a microanalytical device for high throughput screening of samples. The pore sizes of the matrix may be chosen to match the size of the entrapped biological molecule or to correspond in size with the sample molecules to be analyzed. The sol-gel may be formed into structures that can be incorporated into or onto the microanalytical devices as microcolumns, microchannels, and microarrays. The sol-gel may incorporate substituted silanes and thereby provide a hydrophobic or hydrophilic surface, thereby providing the potential for use in microchromatography, microelectrophoresis or combinations thereof on the microanalytical device. A preferred detection method of samples is mass spectrometry.